AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (Currently Amended) An imaging optical apparatus, comprising:

a first detector;

a first optical system with a first entrance aperture and having a first field of view for projecting at least a first portion of a first wavelength range on the first detector;

a second optical system having a second field of view narrower than the first field of view for projecting at least a second portion of the first wavelength range on the first detector; and

a third optical system configured to receive radiation in a second wavelength range, the third optical system being operable with the second optical system to project the radiation in the second wavelength onto the first detector,

wherein the second and third optical systems share a second entrance aperture and wherein the first portion and the second portion of the first wavelength range have a coincident focal plane located at the first detector.

2. (Original) The imaging optical apparatus of claim 1, wherein the first wavelength range is wavelengths emitted from a target.

3. (Original) The imaging optical apparatus of claim 1, wherein the second wavelength range is wavelengths emitted from a first laser and reflected from an object.

4. (Original) The imaging optical apparatus of claim 1, further comprising:

a fourth optical system configured to receive radiation in a third wavelength range emitted by a second laser toward the target and reflected from the target, the fourth optical system sharing the entrance aperture with the second and third optical systems.

5. (Original) The imaging optical apparatus of claim 4, further comprising:

a second detector, wherein the second detector only receives radiation from the fourth optical system.

6. (Original) The imaging optical apparatus of claim 1, further comprising a fold mirror disposed in an optical path between the first entrance aperture and the second entrance aperture and the detector selectively directs to the first detector the first portion of the first wavelength range or the second portion of the first wavelength range and the radiation in the second wavelength range.

7. (Original) The imaging optical apparatus of claim 1, wherein the second portion of the incident radiation is at least partially included within the first portion of incident radiation.

8. (Original) The imaging optical apparatus of claim 1, wherein the third optical system is configured to receive radiation in a second wavelength range emitted by a designator laser toward the target and reflected from the target, the third optical system being selectable to project a designator image onto the detector.

9. (Original) The imaging optical apparatus of claim 1, wherein the imaging optical apparatus is a catadioptric optical system.

10. (Original) The imaging optical apparatus of claim 1, wherein the narrow field of view (NFOV) optical system comprises at least one catadioptric optically significant surface with a narrowband filter.

11. (Original) The imaging optical apparatus of claim 1, wherein the second optical system and the third optical system share an optical axis.

12. (Original) The imaging optical apparatus of claim 1, wherein the detector is a single focal plane array.

13. (Original) The imaging optical apparatus of claim 1, wherein the detector is a hyperspectral detector.

14. (Original) The imaging optical apparatus of claim 1, wherein at least one optically significant surface is a split Mangin mirror with a cemented doublet and a narrowband filter, the optically significant surface having a coating disposed on a

first surface that reflects at least a first desired wavelength and transmits a second desired wavelength.

15. (Original) The imaging optical apparatus of claim 14, wherein the second desired wavelength is reflected at a second surface.

16. (Original) The imaging optical apparatus of claim 14, wherein the second desired wavelength is filtered twice by a single narrowband filter.

17. (Original) The imaging optical apparatus of claim 1, wherein at least one optically significant surface is a Mangin mirror comprising a first element and a second element, the first element having a coating disposed on a first surface that reflects at least a first desired wavelength and transmits a second desired wavelength.

18. (Original) The imaging optical apparatus of claim 17, wherein the second element has a second surface that reflects only the second desired wavelength.

19. (Currently Amended) An imaging optical apparatus, comprising:

a first optical system having a first field of view for projecting at least a first portion of incident radiation emitted from a target to a first focal plane;

a second optical system having a second field of view narrower than the first field of view for projecting at least a second portion of the incident radiation to a second focal plane; and

a third optical system configured to receive radiation reflected from the target, the third optical system being selectable to project the reflected radiation to the second focal plane,

wherein the second and third optical systems share an entrance aperture and wherein the first focal plane and the second focal plane are coincident, and

wherein the second and third optical systems include a common primary mirror and wherein the common primary mirror is a Mangin mirror with a narrowband coating.

20. (Original) The imaging optical apparatus of claim 19, further comprising:

a fourth optical system configured to receive radiation in a third wavelength range emitted by a ranging laser toward the target and reflected from the target, the fourth optical system sharing the entrance aperture with the second and third optical systems.

21. (Original) The imaging optical apparatus of claim 19, wherein the second portion is at least partially included within the first portion.

22. (Original) The imaging optical apparatus of claim 19, wherein the third optical system is configured to receive radiation in a second wavelength range

emitted by a designator laser toward the target and reflected from the target, the third optical system being selectable to project a designator image onto the detector,

23. (Currently Amended) A method of gathering imagery from a target, comprising the steps of:

receiving radiation emitted from a target in a first wavelength range using a first optical system having a wide field of view (WFOV), the first optical system projecting a WFOV image onto a first detector;

receiving radiation emitted from the target in the first wavelength range using a second optical system having a narrow field of view (NFOV), the second optical system projecting a NFOV image onto the first detector; and

receiving radiation in a second wavelength range using a third optical system, said radiation in the second wavelength range being emitted from a first designator laser toward the target and being reflected by the target, the third optical system projecting a designator image onto the first detector,

wherein the second and third optical systems share an entrance aperture and wherein the NFOV image and the designator image can be simultaneously projected onto the first detector, and

wherein the second and third optical systems include a common primary mirror and wherein the common primary mirror is a Mangin mirror with a narrowband coating.

24. (Original) The method of claim 23, comprising a step of:

switching between the narrow field of view and the wide field of view.

25. (Original) The method of gathering imagery from a target of claim 23, further comprising the step of:

receiving radiation in a third wavelength range using a fourth optical system, said radiation in the third wavelength range being emitted from a second designator laser toward the target and being reflected by the target, the fourth optical system projecting a designator image onto a second detector.

26. (Currently Amended) A method of constructing an imaging optical apparatus, comprising the steps of:

providing a first detector;

providing a first optical system having a wide field of view (WFOV) and being configured to receive radiation emitted from a target in a first wavelength range, the first optical system being selectable to project a WFOV image onto the first detector;

providing a second optical system having a narrow field of view (NFOV) and being configured to receive radiation emitted from the target in the first wavelength range, the second optical system being selectable to project a NFOV image onto the first detector; and

providing a third optical system configured to receive radiation in a second wavelength range emitted by a first designator laser toward the target and reflected from the target, the third optical system being selectable to project a designator image onto the first detector,

wherein the second and third optical systems share an entrance aperture and wherein the NFOV image and the designator image can be simultaneously projected onto the first detector, and

wherein the second and third optical systems include a common primary mirror and wherein the common primary mirror is a Mangin mirror with a narrowband coating.

27. (Original) The method of constructing an imaging optical apparatus of claim 26, further comprising the step of:

receiving radiation in a third wavelength range using a fourth optical system, said radiation in the third wavelength range being emitted from a second designator laser toward the target and being reflected by the target, the fourth optical system projecting a designator image onto a second detector.

28. (New) The imaging optical apparatus of claim 1, wherein the first optical system and the second optical system are a forward looking infrared radar and the third optical system is a laser designator.

29. (New) The imaging optical apparatus of claim 4, wherein the fourth optical system is a laser ranger.

30. (New) The imaging optical apparatus of claim 17, wherein the coating is a narrowband filter.

31. (New) The imaging optical apparatus of claim 17, wherein the coating is a rugate coating and the first surface is a backside surface of the first element.

32. (New) The imaging optical apparatus of claim 1, wherein at least one optically significant surface is a combination of a lens and a Mangin mirror.

33. (New) The imaging optical apparatus of claim 32, wherein the lens and the Mangin mirror are separated by an air space.

34. (New) The imaging optical apparatus of claim 33, comprising a mirror located within an opening in the radial center of the combination of the lens and the Mangin mirror.

35. (New) The imaging optical apparatus of claim 1, wherein the imaging optical apparatus is passively athermalized.

36. (New) The imaging optical apparatus of claim 19, wherein the first optical system and the second optical system are a forward looking infrared radar and the third optical system is a laser designator.

37. (New) The imaging optical apparatus of claim 20, wherein the fourth optical system is a laser ranger.

38. (New) The imaging optical apparatus of claim 19, wherein the primary mirror is a split mirror with a first portion and a second portion and the narrowband coating is at an interface of the first portion and the second portion.

39. (New) The imaging optical apparatus of claim 38, wherein the split mirror is a cemented doublet with a narrowband filter at a cemented surface.

40. (New) The imaging optical apparatus of claim 19, wherein the narrowband coating is a rugate coating on a backside of the primary mirror.

41. (New) The imaging optical apparatus of claim 19, wherein the second and third optical systems include at least one optically significant surface, the optically significant surface having a combination of a lens and a Mangin mirror.

42. (New) The imaging optical apparatus of claim 41, wherein the lens and the Mangin mirror are separated by an air space.

43. (New) The imaging optical apparatus of claim 41, comprising a mirror located within an opening in the radial center of the combination of the lens and the Mangin mirror.

44. (New) The imaging optical apparatus of claim 19, wherein the imaging optical apparatus is passively athermalized.

45. (New) The method of claim 23, wherein the first optical system and the second optical system are a forward looking infrared radar and the third optical system is a laser designator.

46. (New) The method of gathering imagery from a target of claim 25, wherein the fourth optical system is a laser ranger.

47. (New) The imaging optical apparatus of claim 23, wherein the primary mirror is a split mirror with a first portion and a second portion and the narrowband coating is at an interface of the first portion and the second portion.

48. (New) The imaging optical apparatus of claim 47, wherein the split mirror is a cemented doublet with a narrowband filter at a cemented surface

49. (New) The imaging optical apparatus of claim 23, wherein the narrowband coating is a rugate coating on a backside of the primary mirror.

50. (New) The imaging optical apparatus of claim 23, wherein the second and third optical systems include at least one optically significant surface, the optically significant surface having a combination of a lens and a Mangin mirror.

51. (New) The imaging optical apparatus of claim 50, wherein the lens and the Mangin mirror are separated by an air space.

52. (New) The imaging optical apparatus of claim 50, comprising a mirror located within an opening in the radial center of the combination of the lens and the Mangin mirror.

53. (New) The imaging optical apparatus of claim 23, wherein the imaging optical apparatus is passively athermalized.

54. The method of constructing an imaging optical apparatus of claim 26, wherein the first optical system and the second optical system are a forward looking infrared radar and the third optical system is a laser designator.

55. (New) The method of constructing an imaging optical apparatus of claim 27, wherein the fourth optical system is a laser ranger.

56. (New) The method of constructing an imaging optical apparatus of claim 26, wherein the primary mirror is a split mirror with a first portion and a second portion and the narrowband coating is at an interface of the first portion and the second portion.

57. (New) The imaging optical apparatus of claim 56, wherein the split mirror is a cemented doublet with a narrowband filter at a cemented surface

58. (New) The method of constructing an imaging optical apparatus of claim 26, wherein the narrowband coating is a rugate coating on a backside of the primary mirror.

59. (New) The method of constructing an imaging optical apparatus of claim 26, wherein the second and third optical systems include at least one optically significant surface, the optically significant surface having a combination of a lens and a Mangin mirror.

60. (New) The method of constructing an imaging optical apparatus of claim 59, wherein the lens and the Mangin mirror are separated by an air space.

61. (New) The method of constructing an imaging optical apparatus of claim 59, comprising a mirror located within an opening in the radial center of the combination of the lens and the Mangin mirror.

62. (New) The method of constructing an imaging optical apparatus of claim 26, wherein the imaging optical apparatus is passively athermalized.